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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/328,646	06/09/1999	SHI-QING WANG	30-4687(4780	7096

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EXAMINER
VU, HUNG K

ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 01/30/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/328,646	Applicant(s) WANG ET AL.	
	Examiner Hung K. Vu	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cov r sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 November 2001* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,11,12,15,16,19,20 and 23-33* is/are pending in the application.

4a) Of the above claim(s) *1-8,11,12,15,16,19 and 20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *23-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the substrate and the organic layer on the substrate which comprises a pattern of metal lines on the substrate and an organic dielectric on the substrate between the metal lines and an inorganic layer on the organic layer which comprises an inorganic dielectric having metal filled vias therethrough which connect to the metal lines of the organic layer, as recited in claim 23; an additional organic layer on the inorganic which comprises a pattern of additional metal lines on the inorganic layer and an organic dielectric on the inorganic layer between the additional metal lines and an additional inorganic layer on the additional organic layer which comprises an inorganic dielectric having metal filled vias therethrough which connect to the additional metal lines of the additional organic layer, as recited in claim 24; and one or more further alternating organic layers (c) and inorganic layers (d) on the additional organic layer (c) and inorganic layer (d), as recited in claim 25; further comprising an organic dielectric layer on the inorganic layer between the vias and under the additional metal lines of the additional organic layer, and an inorganic dielectric on the organic dielectric layer between the additional metal lines of the additional organic layer; as recited in claim 26; further comprising an organic dielectric on each one or more alternating inorganic layer (d) between the vias and under the additional metal lines of the alternating organic layer, and an inorganic dielectric on each one or more organic dielectric layer between the additional metal lines of the additional organic layer, as recited in claim 27; must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 23-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Zhao (PN 6,071,809).

Zhao discloses an integrated circuit structure which comprises a substrate (302) and an organic layer (316,upper portion of 602) on the substrate which comprises a pattern of metal lines on the substrate and an organic dielectric on the substrate between the metal lines; and an inorganic layer (lower portion of 604 that is equivalent to 310) on the organic layer which comprises an inorganic dielectric selected from the group consisting of hydrogensiloxanes, inorganic hydrogensilsesquioxanes and combinations thereof, having metal filled vias therethrough which connect to the metal lines of the organic layer. Note Figures 3a - 6 of Zhao.

With regard to claim 24, Zhao discloses the structure comprises,

An additional organic layer on the inorganic layer which comprises a pattern of additional metal lines on the inorganic layer and an organic dielectric on the inorganic layer between the additional metal lines;

An additional inorganic layer on the additional organic layer which comprises an inorganic dielectric having metal filled vias therethrough which connect to the additional metal lines of the additional organic layer.

With regard to claim 25, Zhao discloses the structure comprises on or more further alternating organic layers (c) and inorganic layers (d) on the additional organic layer (c) and inorganic layer (d).

With regard to claim 26, Zhao discloses the structure further comprising an organic dielectric layer on the inorganic layer between the vias and under the additional metal lines of the additional organic layer; and an inorganic dielectric on the organic dielectric layer between the additional metal lines of the additional organic layer.

With regard to claim 27, Zhao discloses the structure further comprising an organic dielectric layer on each one or more alternating inorganic layer (d) between the vias and under the additional metal lines of the alternating organic layer; and an inorganic dielectric on each one or more organic dielectric layer between the additional metal lines of the additional organic layer.

With regard to claim 28, Zhao discloses the metal lines and vias have a barrier metal on one or more edges thereof.

With regard to claim 29, Zhao discloses a dielectric coated substrate which comprises;

A first dielectric composition film (310) on a substrate (302);

A second dielectric composition film (316) on the first dielectric composition film;

Wherein the first dielectric composition and the second dielectric composition have substantially different etch resistance;

Wherein either the first dielectric composition film is organic and the second dielectric composition film is inorganic; or the first dielectric composition film is inorganic and the second dielectric composition film is organic; and wherein the inorganic dielectric composition film comprises an inorganic dielectric selected from the group consisting of hydrogenxiloxanes, inorganic hydrogensilsesquioxanes and combinations thereof.. Note that because two films have different dielectric composition, it is inherent that they have substantially different etch resistance.

With regard to claim 30, Zhao discloses the first dielectric composition film (116) is organic and the second dielectric composition film (118) is inorganic.

With regard to claim 31, Zhao discloses the first dielectric composition film (118) is inorganic and the second dielectric composition film (116) is organic.

3. Claims 23-33 are rejected under 35 U.S.C. 102(e) as being anticipated by Ross (PN 6,207,555, of record).

Ross discloses an integrated circuit structure which comprises a substrate (2) and an organic layer (4) on the substrate which comprises a pattern of metal lines on the substrate and an organic dielectric on the substrate between the metal lines; and an inorganic layer (14,26,28) on the organic layer which comprises an inorganic dielectric selected from the group consisting of hydrogensiloxanes, inorganic hydrogensilsesquioxanes and combinations thereof, having metal filled vias therethrough which connect to the metal lines of the organic layer. Note Figures 1 - 32 of Ross.

With regard to claim 24, Ross discloses the structure comprises,

An additional organic layer on the inorganic layer which comprises a pattern of additional metal lines on the inorganic layer and an organic dielectric on the inorganic layer between the additional metal lines;

An additional inorganic layer on the additional organic layer which comprises an inorganic dielectric having metal filled vias therethrough which connect to the additional metal lines of the additional organic layer.

With regard to claim 25, Ross discloses the structure comprises on or more further alternating organic layers (c) and inorganic layers (d) on the additional organic layer (c) and inorganic layer (d).

With regard to claim 26, Ross discloses the structure further comprising an organic dielectric layer on the inorganic layer between the vias and under the additional metal lines of the additional organic layer; and an inorganic dielectric on the organic dielectric layer between the additional metal lines of the additional organic layer.

With regard to claim 27, Ross discloses the structure further comprising an organic dielectric layer on each one or more alternating inorganic layer (d) between the vias and under the additional metal lines of the alternating organic layer; and an inorganic dielectric on each one or more organic dielectric layer between the additional metal lines of the additional organic layer.

With regard to claim 28, Ross discloses the metal lines and vias have a barrier metal on one or more edges thereof.

With regard to claim 29, Ross discloses a dielectric coated substrate which comprises;

A first dielectric composition film (4) on a substrate (2);

A second dielectric composition film (6) on the first dielectric composition film;

Wherein the first dielectric composition and the second dielectric composition have substantially different etch resistance;

Wherein either the first dielectric composition film is organic and the second dielectric composition film is inorganic; or the first dielectric composition film is inorganic and the second dielectric composition film is organic; and wherein the inorganic dielectric composition film comprises an inorganic dielectric selected from the group consisting of hydrogenxiloxanes,

inorganic hydrogensilsesquioxanes and combinations thereof.. Note that because two films have different dielectric composition, it is inherent that they have substantially different etch resistance.

With regard to claim 30, Ross discloses the first dielectric composition film (116) is organic and the second dielectric composition film (118) is inorganic.

With regard to claim 31, Ross discloses the first dielectric composition film (118) is inorganic and the second dielectric composition film (116) is organic.

With regard to claims 32-33, Ross discloses hygrogensiloxanes and hydrogensilsesquioxanes have the formulas as claimed.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao (PN 6,071,809).

Zhao discloses all of the claimed limitation except hygrogensiloxanes and hydrogensilsesquioxanes have the formulas as claimed. However, it would have been obvious to

one of ordinary skill in the art at the time the invention was made to form hygrogensiloxanes and hydrogensilsesquioxanes have the formulas as claimed by adjusting the composition to have the desire dielectric constant.

Response to Arguments

5. Applicant's arguments with respect to claims 23 and 29 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments about the restriction filed 11/19/01 have been fully considered but they are not persuasive. Note Office Action # 5, 8, 14, and MPEP section 806.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (703) 308-4079. The examiner can normally be reached on Mon-Thurs 7:00-5:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

January 24, 2002

Steven Loke
Primary Examiner

Steven Loke